Logarthmic functions are inverses of exponential functions

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\begin{array}{rcll}
10^4 &=& 10000 & \text{so} \quad \log_{10}(10000) = 4 \\
10^3 &=& 1000 & \text{so} \quad \log_{10}(1000) = 3 \\
10^2 &=& 100 & \text{so} \quad \log_{10}(100) = 2 \\
10^1 &=& 10 & \text{so} \quad \log_{10}(10) = 1 \\
10^0 &=& 1 & \text{so} \quad \log_{10}(1) = 0 \\
10^{-1} &=& 0.1 & \text{so} \quad \log_{10}(0.1) = -1 \\
10^{-2} &=& 0.01 & \text{so} \quad \log_{10}(0.01) = -2 \\
10^{-3} &=& 0.001 & \text{so} \quad \log_{10}(0.001) = -3 \\
10^{-4} &=& 0.0001 & \text{so} \quad \log_{10}(0.0001) = -4
\end{array}
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\begin{array}{rcll}
3^5 &=& 243 & \text{so} \quad \log_3(243) = 5 \\
3^4 &=& 81 & \text{so} \quad \log_3(81) = 4 \\
3^3 &=& 27 & \text{so} \quad \log_3(27) = 3 \\
3^2 &=& 9 & \text{so} \quad \log_3(9) = 2 \\
3^1 &=& 3 & \text{so} \quad \log_3(3) = 1 \\
3^0 &=& 1 & \text{so} \quad \log_3(1) = 0 \\
3^{-1} &=& \frac{1}{3} & \text{so} \quad \log_3\left(\frac{1}{3}\right) = -1 \\
3^{-2} &=& \frac{1}{9} & \text{so} \quad \log_3\left(\frac{1}{9}\right) = -2 \\
3^{-3} &=& \frac{1}{27} & \text{so} \quad \log_3\left(\frac{1}{27}\right) = -3 \\
3^{-4} &=& \frac{1}{81} & \text{so} \quad \log_3\left(\frac{1}{81}\right) = -4 \\
3^{-5} &=& \frac{1}{243} & \text{so} \quad \log_3\left(\frac{1}{243}\right) = -5
\end{array}
$$

$$
\begin{aligned}
2^{10} &= 1024 \quad \text{so} \quad \log_2(1024) = 10 \\
2^{9} &= 512 \quad \text{so} \quad \log_2(512) = 9 \\
2^{8} &= 256 \quad \text{so} \quad \log_2(256) = 8 \\
2^{7} &= 128 \quad \text{so} \quad \log_2(128) = 7 \\
2^{6} &= 64 \quad \text{so} \quad \log_2(64) = 6 \\
2^{5} &= 32 \quad \text{so} \quad \log_2(32) = 5 \\
2^{4} &= 16 \quad \text{so} \quad \log_2(16) = 4 \\
2^{3} &= 8 \quad \text{so} \quad \log_2(8) = 3 \\
2^{2} &= 4 \quad \text{so} \quad \log_2(4) = 2 \\
2^{1} &= 2 \quad \text{so} \quad \log_2(2) = 1 \\
2^{0} &= 1 \quad \text{so} \quad \log_2(1) = 0
\end{aligned}
$$

$$2^{-1} = \frac{1}{2} \quad \text{so} \quad \log_2\left(\frac{1}{2}\right) = -1$$

$$2^{-2} = \frac{1}{4} \quad \text{so} \quad \log_2\left(\frac{1}{4}\right) = -2$$

$$2^{-3} = \frac{1}{8} \quad \text{so} \quad \log_2\left(\frac{1}{8}\right) = -3$$

$$2^{-4} = \frac{1}{16} \quad \text{so} \quad \log_2\left(\frac{1}{16}\right) = -4$$

$$2^{-5} = \frac{1}{32} \quad \text{so} \quad \log_2\left(\frac{1}{32}\right) = -5$$

$$2^{-6} = \frac{1}{64} \quad \text{so} \quad \log_2\left(\frac{1}{64}\right) = -6$$

$$2^{-7} = \frac{1}{128} \quad \text{so} \quad \log_2\left(\frac{1}{128}\right) = -7$$

$$2^{-8} = \frac{1}{256} \quad \text{so} \quad \log_2\left(\frac{1}{256}\right) = -8$$

$$2^{-9} = \frac{1}{512} \quad \text{so} \quad \log_2\left(\frac{1}{512}\right) = -9$$

$$2^{-10} = \frac{1}{1024} \quad \text{so} \quad \log_2\left(\frac{1}{1024}\right) = -10$$